

Rocky Flats Environmental Technology Site

Building 776/777

Area V

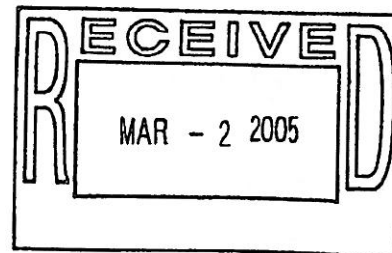
Final

Survey Report

Survey Units:
776044, 776045, 776046

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January 2005



ADMIN RECORD

DOES NOT CONTAIN
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J. A. Noshkin
Name/Org: *EMCC Class'n* Date: *1/6/08*
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OK for public release

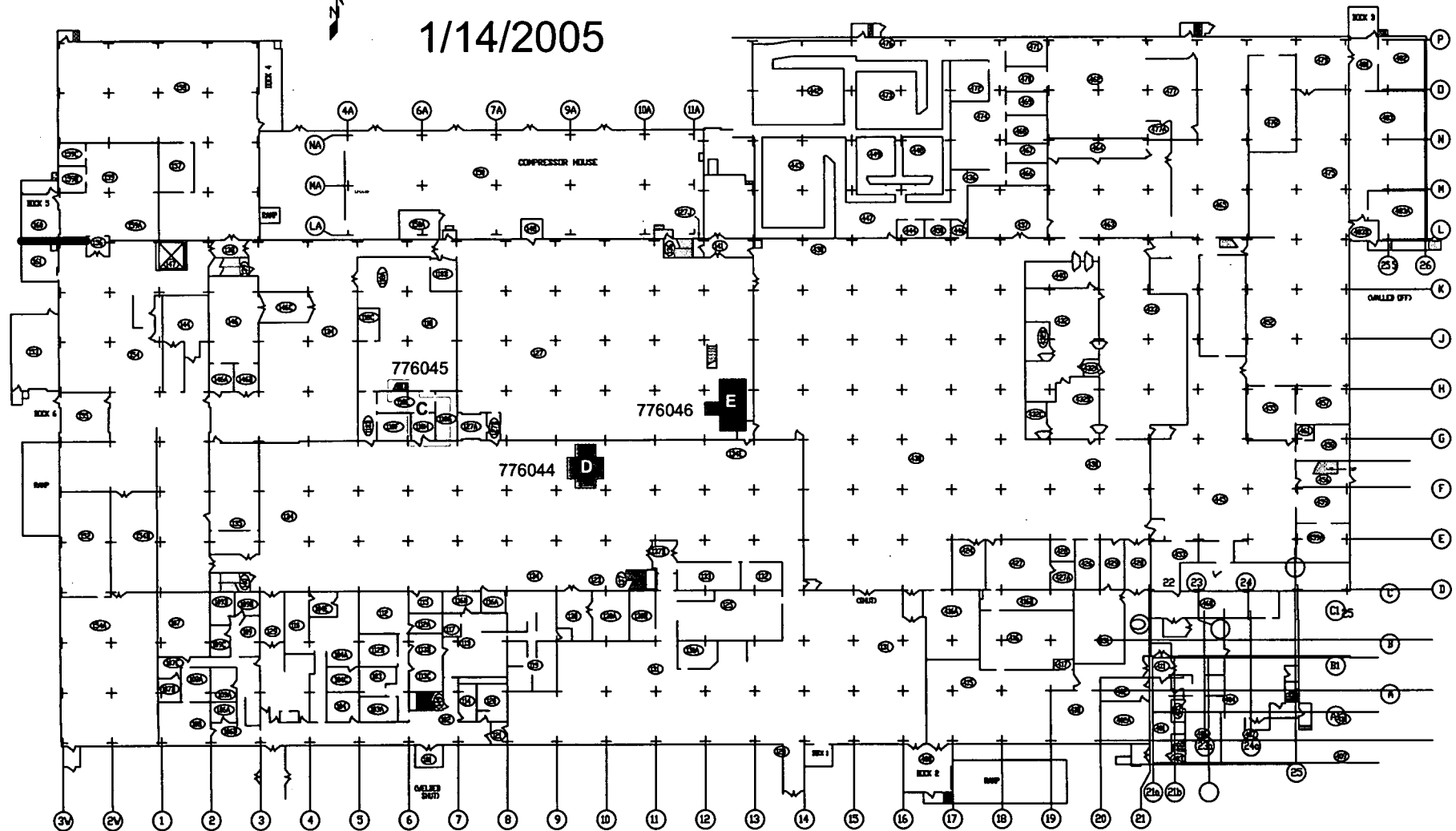
B776-A-000301

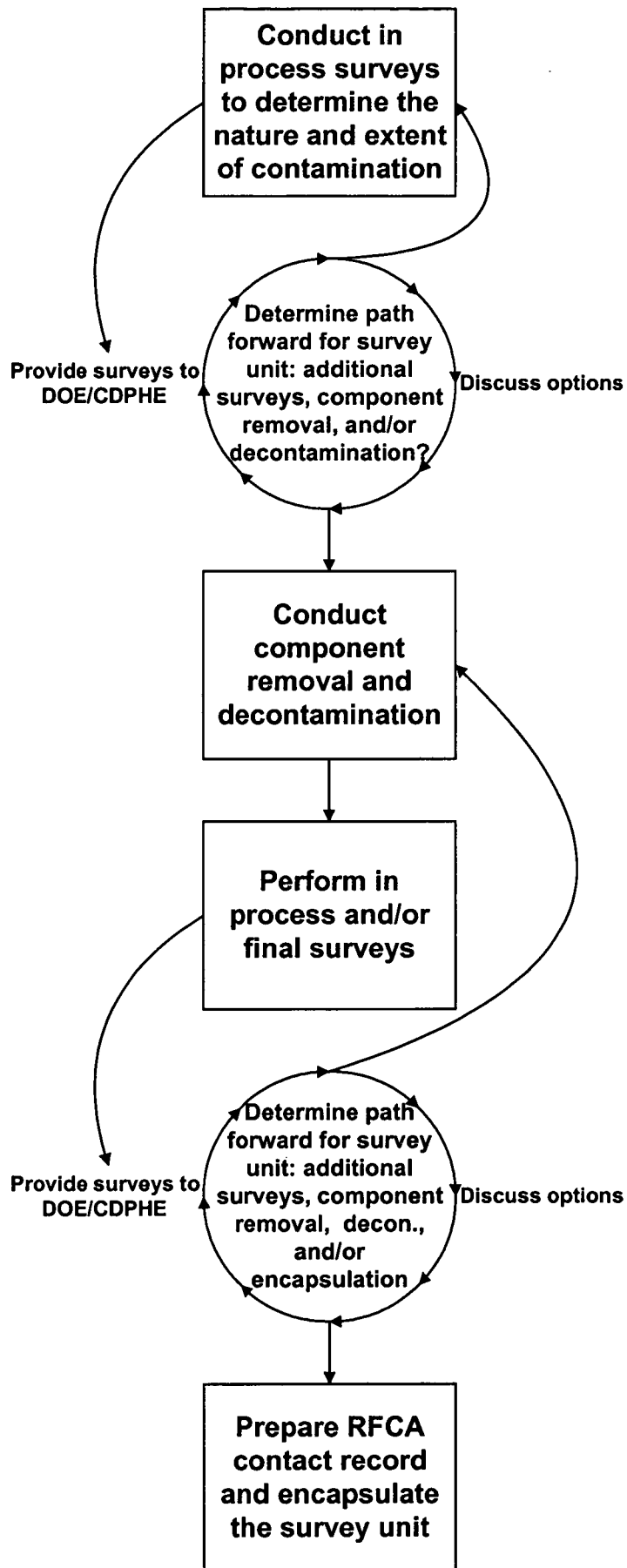
26

B776/777 SURVEY UNITS

1st FLOOR

1/14/2005





Area V Buried Equipment Survey Instructions

Survey/ Sampling Instructions

Purpose:

To collect gross gamma data to determine the potential contamination levels in buried equipment pits of Area V. Work to be performed in accordance with "INS-535-Ludlum2350-1 with Sodium Iodide Detector"

Equipment and materials:

- 1) A Ludlum 44-17 Attached to a Ludlum 2350-1 set to collect 30 second counts that will be displayed on its LCD window.
- 2) Tin collimator for 44-17

Procedure:

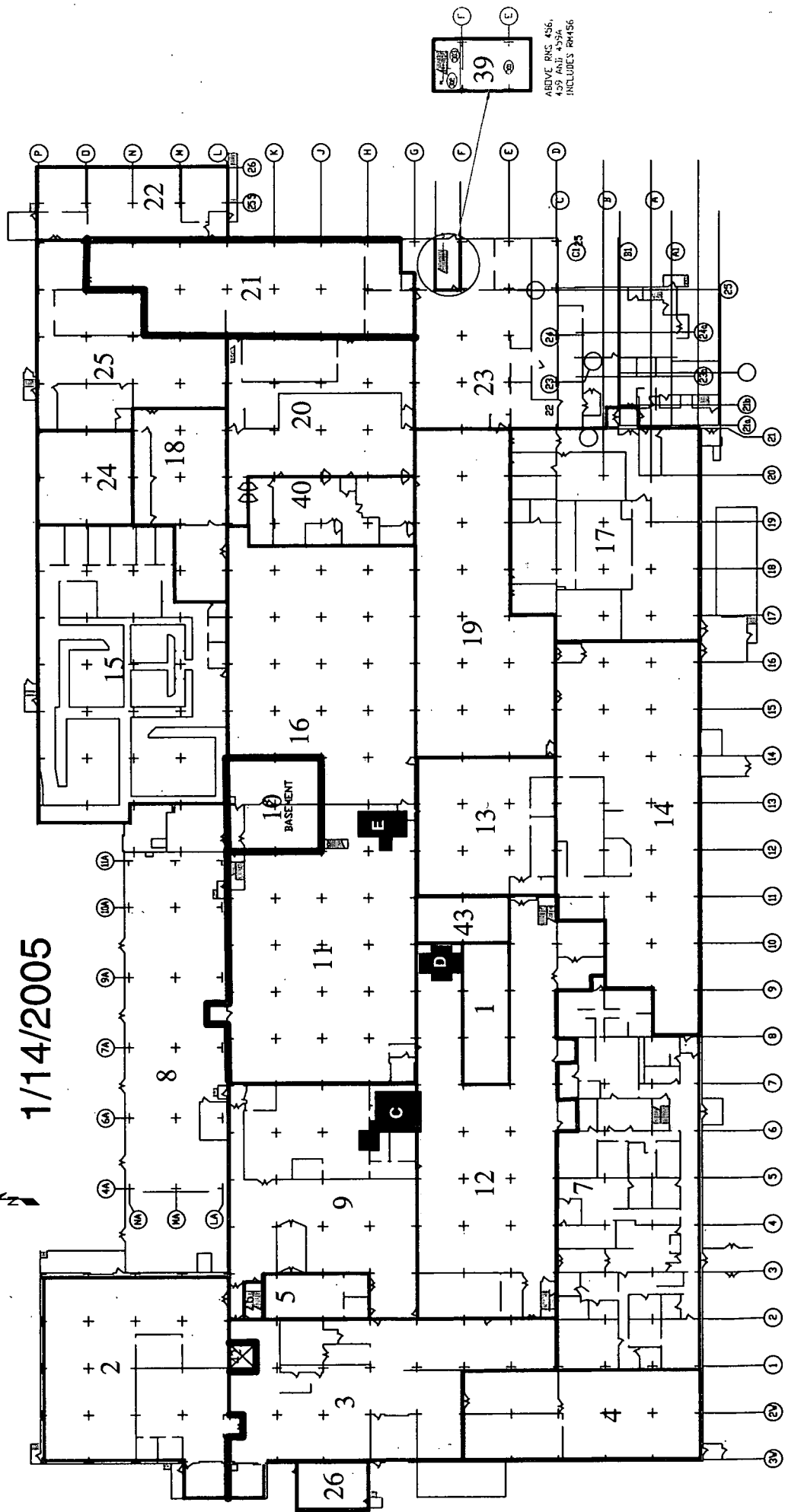
- 1) RCT, ensure the instrument is functioning by using Americium source TS-912. Obtain one 60 second count at the beginning and end of each workday.
- 2) RCT, inspect instrument for obvious damage and perform a battery check on the instrument.
- 3) RCT, obtain a 60 second background measurement in designated area near step off pad.
- 4) NaI measurements shall be taken along the edges of buried equipment pads exposed by floor removal in area V. See attached map for locations of the buried equipment pads, label "C", "D" and "E".
- 5) Take a 30-second reading once every 5 feet along exposed edges. If rubble or soil blocks area, and 5-foot intervals are not possible, take readings as frequently as possible along edges
- 6) Record results on the attached survey form with a survey map drawn on reverse side.

Summary of Survey Instructions

Table -1				
Location	Type of Survey	Probe	Placement	Count time
Listed on attached spread sheet	Total Alpha	44-17	On contact with exposed edge.	30 seconds

4

B776/777 SURVEY UNITS
1st FLOOR
1/14/2005



Final Survey Report For Survey Unit 776044

Initial Scope

This report is prepared to summarize characterization surveys of survey unit 776044. Survey unit 776044 is a concrete monolith beneath the floor of room 134. This survey unit starts beneath the slab of 776012 and extends to 21.5 feet below the building foundation. Because this is under-slab contamination and will be managed by Environmental Restoration, the estimated inventory for this survey unit will not be included in the building inventory when modeling for potential offsite releases.

Historical Review

This area was the pit that contained the lower portions of the Marform Press. The pit filled with thousands of gallons of firewater during the 1969 fire. The pit was pumped out and the press with most of its associated equipment was removed after the 1969 fire. Worker interviews documented in appendix 21 of the "Building 777/776 Buried Equipment White Paper Set 84 " indicate that the pit below the marform press was decontaminated and painted prior to being back filled with concrete. Core sampling of the area in November 2002 encountered contaminated metal and concrete to depths up to 21.5 feet below the current floor surface. The core sampling indicates that only a large piece of metal called the Marform Cylinder remains in the bottom of survey unit 776044.

Methods and Techniques

Surfaces were evaluated for potential contamination along cracks that once formed the tops of walls using sodium iodide (NaI) detectors attached to single channel analyzers windowed for the 59 keV gamma-ray(²⁴¹Am). Measurements were taken on contact with the cracks formed in the floor of room 134 when the area containing the bottom of the Marform Press was back filled. These cracks are the interface between the floor of room 134 and the new concrete used to fill the area that contained the Marform Press. Readings from these cracks will be used to represent the walls of the back filled area. Direct Alpha measurements were obtained from pieces of metal and concrete that were retrieved by core bores. These readings will be used to represent the contamination levels on the Marform Cylinder and the floor of the back-filled area.

Final Survey Report For Survey Unit 776044

Results

The survey involved taking measurements at over 30 points. Some of the data was collected by RCT's covering the core boring and the remainder collected while remediating cracks in the floor of survey unit 776012.

Accessible Areas

Floors

Survey unit 776044 does not have any accessible floors. Contamination estimates for the floors are discussed in the inaccessible area section.

Walls

Survey unit 776044 does not have accessible Walls. Contamination estimates for the walls are discussed in the inaccessible area section.

Ceilings

Survey unit 776044 does not have a ceiling. All contamination found on the same level as the slab was accounted for as part of the floor in survey unit 776012.

Inaccessible Areas

Floors

The contamination levels for the floor are estimated using survey data obtained from boreholes numbered D-7, D-9 and D-12. Contamination levels from 500 dpm/100cm² to 300,000 dpm/100cm² were detected. The average contamination level on the floors is assumed to be 150,000 dpm/100cm² (6.76μCi/m²). The surface area of the floor is estimated from map # SK-T0110315-05 to be 12.12 m².

Surface	Total Surface Area (square meters)	Contamination Levels (μCi/m ²)	Total Activity μCi
Floors	12.12	6.76	81.93

Walls

The walls of this survey unit are solid concrete. None of the walls are structural. None of the walls can be removed without removing the B776 slab first. The contamination levels found while remediating cracks in room 134 are assumed to be representative of the contamination levels on the walls of this survey unit. It is assumed that the levels decrease

Final Survey Report

For

Survey Unit 776044

with depth until they reach the contamination levels found by core sampling to the floor.

From Drawing 17219, the walls are estimated to be 21.5 feet high. There are 60 linear feet of walls. The total surface area of the walls is 1290 square feet or 119.8 square meters.

The average contamination levels for the walls are estimated from data on cracks provided in the final survey report for 776012. The top of the walls is estimated to average 13,013,952 dpm/100cm², and the bottom is assumed to have the same average as the floors, which is 150,000 dpm/100cm². The average contamination level for the walls is 6,581,976 dpm/100cm², which is equal to 296.48 µCi/m².

Surface	Total Surface Area (square meters)	Contamination Levels (µCi/m ²)	Total Activity µCi
Walls	119.8	296.48	35,519 µCi

Hydraulic Cylinder

The contamination levels for this piece of metal are calculated using data from bore holes D7, D8, D9, D12, D16, D19 and D22. The levels found on the metal were between 70,000 and 300,000 dpm/100cm².

From the surveys of these boreholes, the average contamination level on the Marform Cylinder is 185,000 dpm/100cm² (8.33 µCi/m²). The surface area is estimated by assuming the base of the press is 6 feet (1.83m) high with a 4.5 feet (1.37m) outer diameter and a 3 feet (0.91m) inner diameter. The cap of the cylinder is assumed to be a hemisphere with a radius of 2 feet (0.6m). The large metal bolts and associated footings that held the cylinder in place are assumed to have the same surface area as the cylinder and cap therefore, the area for them will be estimated by multiplying the cylinder surface area by two. The total area is estimated to be to be:

Outer cylinder-

$$\text{Area} = \pi * 1.37 \text{ m} * 1.83 \text{ m} = 7.88 \text{ m}^2$$

Inner cylinder-

$$\text{Area} = \pi * 0.91 \text{ m} * 1.83 \text{ m} = 5.23 \text{ m}^2$$

Final Survey Report For Survey Unit 776044

The cap

$$\text{Area} = 0.5 * 4\pi * 0.6 * 0.6 = 2.26 \text{ m}^2$$

$$\text{Total area} = 2 * (2.26 + 5.23 + 7.88) \text{ m}^2 = 30.74 \text{ m}^2$$

Surface	Total Surface Area (square meters)	Contamination Levels ($\mu\text{Ci}/\text{m}^2$)	Total Activity
Hydraulic Cylinder	30.74	8.33	256.06

Inventory for Survey Unit 776044

The inventory below is summed from the above tables in this report. A formal PDS survey is not possible in this survey unit because it is filled with concrete and is located below the slab of the building.

Final Results

	Final Results
776044 Inaccessible Area Source Term (μCi)	35,857
776044 Accessible Area Source Term (μCi)	N/A
776044 Total Source Term (μCi)	35,857
Survey Unit Wall, Ceiling, and Floor Area (m^2)	162.7
(ASCV_w) ($\mu\text{Ci}/\text{m}^2$)	220.4
(ASCV_w) (dpm/100cm ²)	4,892,880

AREA V FLOOR

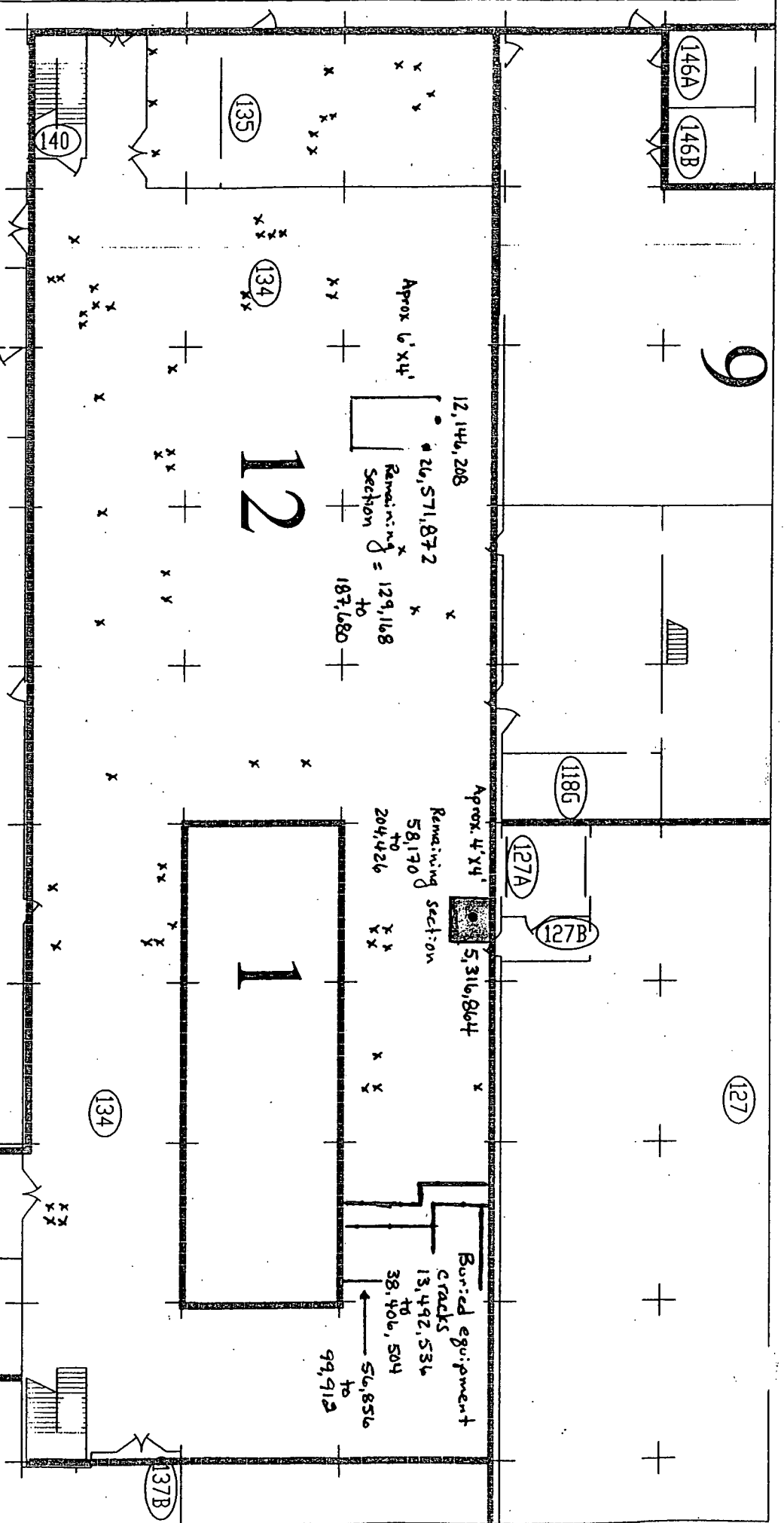
- = Readings taken @ 1" above soil
- = Readings taken @ 8"-10" deep
- x = Hot spots (bolts or cracks < 1 FT in length)

Range of hot spots post remediation

Results in down 100 cm²

776012 Spot & Crack Survey St Remediation

3 4 5 6 7 8 9 10



Final Survey Report For Survey Unit 776045

Initial Scope

This report is prepared to summarize characterization data for survey unit 776045. Survey Unit 776045 consists of the former 4-High rolling mill pit, located beneath the floors of rooms 118E, 118G, 118H and the southwest corner of room 127. The estimated inventory for this survey unit will not be included in the building inventory when modeling for potential offsite releases.

Historical Review

The 4-high rolling mill pit is located beneath the floor of Rooms 118E, 118G, 118H, and 134 (ref drawing RF76-17217). Based on the original retiree interviews conducted as part of the 1998 scoping effort it was indicated that there may have been equipment encased in concrete in the 4-high rolling mill pit. Eight core samples taken in 2003 did encounter pieces of metal, but not enough to indicate the rolling mill or any other substantial amount of equipment is present in this area.

Methods and Techniques

Surfaces were evaluated for potential contamination along cracks that once formed the tops of walls of survey unit 776045. Sodium iodide (NaI) detectors attached to single channel analyzers windowed for the 59 keV gamma-ray(^{241}Am) were used to detect contamination embedded in the cracks. Measurements were taken on contact with the cracks formed in the floor of room 118 when the area that once contained the 4 high rolling mill was back filled. Readings from these cracks will be used to represent the walls of the back filled area. Direct alpha measurements were obtained from pieces of metal and concrete that were retrieved by core bores. These readings will be used to represent the contamination levels on the floor of the back-filled area.

Results

The survey involved using measurements from over 20 points that are considered representative of the survey unit. RCT's covering the core sampling collected some of the data and the remainder was collected along cracks in the floor of survey unit 776009.

Accessible Areas

Final Survey Report For Survey Unit 776045

Floors

Survey unit 776045 does not have any accessible floors. Contamination estimates for the floors are discussed in the inaccessible area section.

Walls

Survey unit 776045 does not have accessible walls. Contamination estimates for the walls are discussed in the inaccessible area section.

Ceilings

Survey unit 776045 does not have a ceiling. All contamination found on the same level as the slab was accounted for as part of the floor in survey unit 776012.

Inaccessible Areas

Floors

The contamination levels for the floor are estimated using survey data obtained from core sample C-2a. All other core samples indicate no contamination was encountered at depth, but the contamination in these cores may have been imbedded in the concrete. The average contamination level for the floor is 100,000 dpm/100cm², which is equal to 4.5 $\mu\text{Ci}/\text{m}^2$.

The area of the floor is conservatively estimated from map RF-17217 to be 30.2 m².

Surface	Total Surface Area (square meters)	Contamination Levels ($\mu\text{Ci}/\text{m}^2$)	Total Activity μCi
Floors	30.2	4.5	135.9

Walls

The walls of this survey unit are solid concrete. None of the walls are structural. None of the walls can be removed without removing the B776 slab first. The contamination levels found while surveying the cracks in room 118H, and 118G are assumed to be representative of the contamination levels on the walls of this survey unit. It is assumed that the levels decrease with depth until they reach the contamination levels found by core sampling of the floor.

Final Survey Report For Survey Unit 776045

From drawing # RF-76-17217, the walls are estimated to be 6.33 feet high. There are 80 linear feet of walls. The total surface area of the walls is 506.4 square feet or 47 square meters.

The average contamination levels for the walls are estimated from data on cracks surveyed as the floor of survey unit 776009 was demolished and removed. The average levels found along the top of the walls is 3,555,888 dpm/100cm². It is assumed these levels decrease to the 100,000 dpm/100cm² of the floor. The average contamination on the walls is the average between the top of the walls and the floor.

The average contamination level on the walls is 1,827,944 dpm/100cm² (82.34 μ Ci/m²)

Surface	Total Surface Area (square meters)	Contamination Levels (μ Ci/m ²)	Total Activity μ Ci
Walls	47	82.34	3870

The few pieces of metal found in the core samples appear to have been the metal used to protect the corners of concrete around the sump in the bottom of the rolling mill pit and a remnant of one of the rolling mill's anchor. These items are adequately represented by the estimate of contamination on the floor of the rolling mill pit.

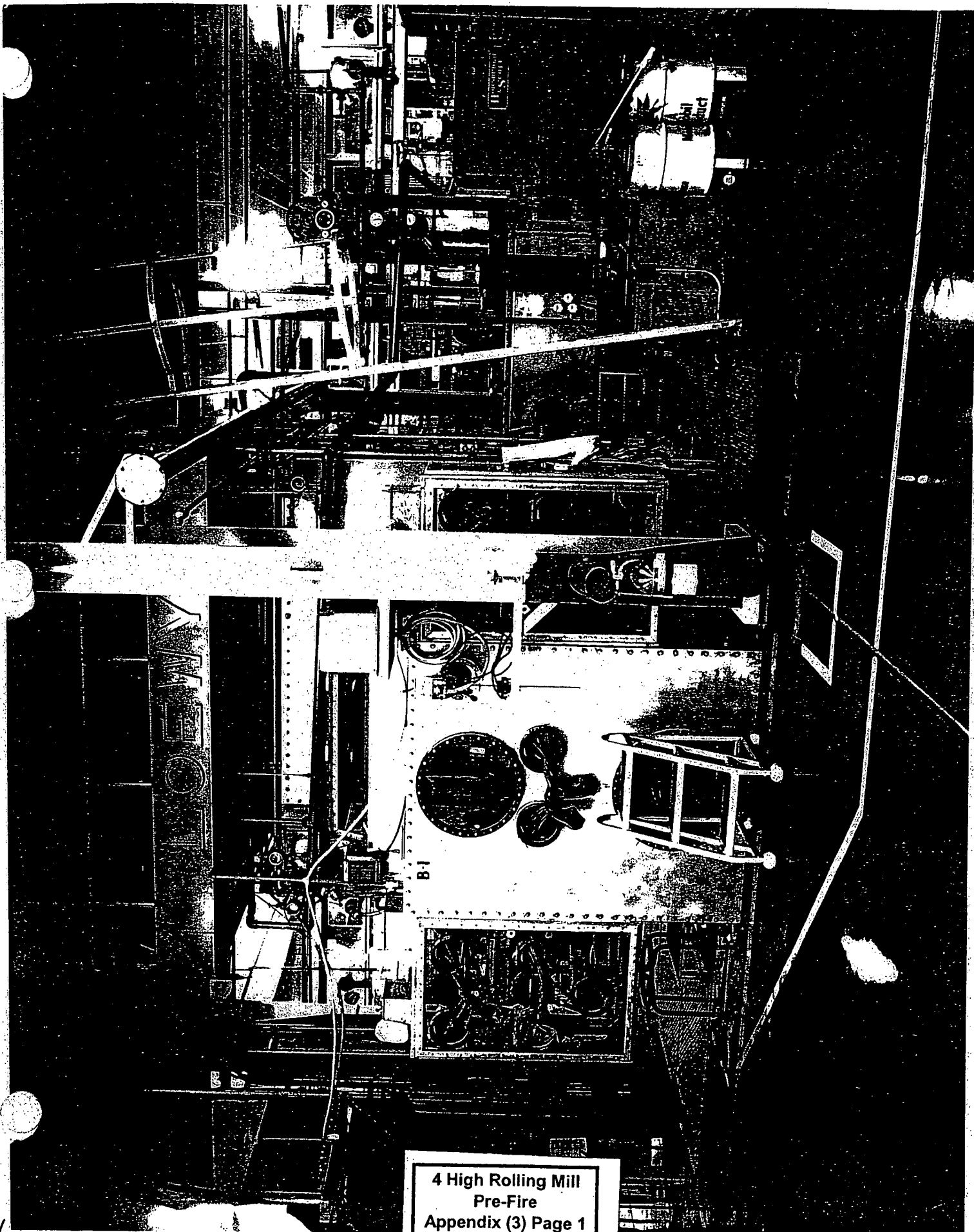
Inventory for Survey Unit 776045

The inventory below is calculated from the above tables in this report. A formal PDS survey is not possible in this survey unit because it is filled with concrete and is located below the slab of the building.

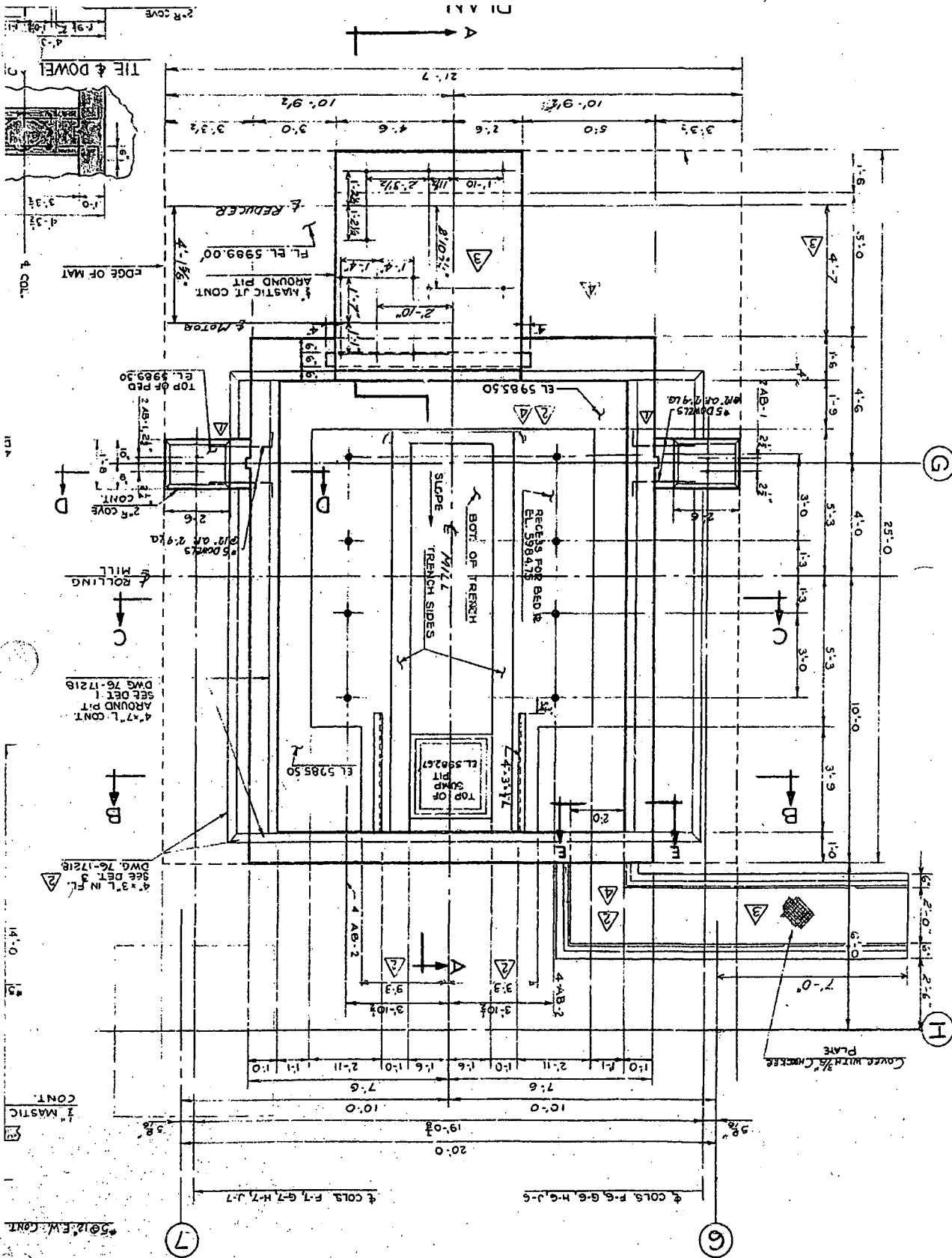
Final Results

	Final Results
776045 Inaccessible Area Source Term (μ Ci)	4005.9
776045 Accessible Area Source Term (μ Ci)	N/A
776045 Total Source Term (μ Ci)	4005.9
Survey Unit Wall, Ceiling, and Floor Area (m ²)	77.2
(ASCV _w) (μ Ci/m ²)	51.9
(ASCV _w) (dpm/100cm ²)	1,152,180

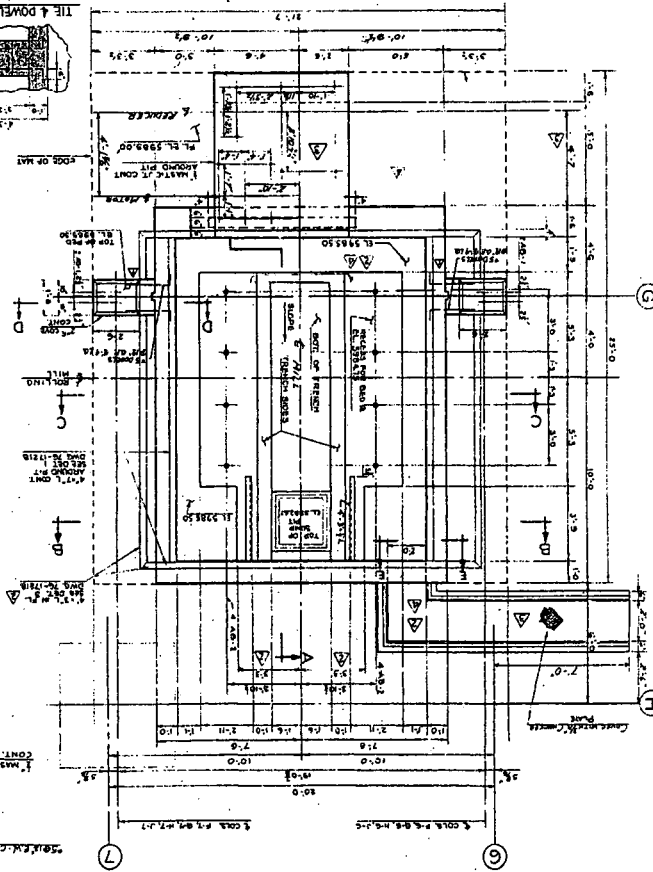
13



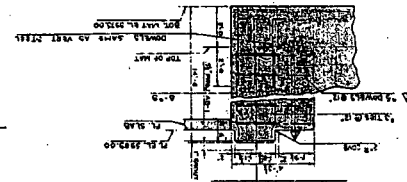
4 High Rolling Mill
Pre-Fire
Appendix (3) Page 1



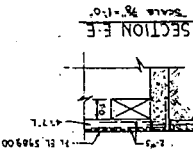
RF-76-17217



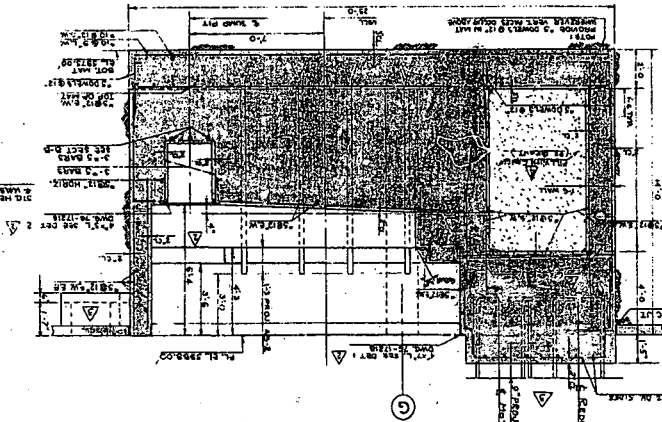
SECTION D-D
SCALE 1/4" = 1'-0"



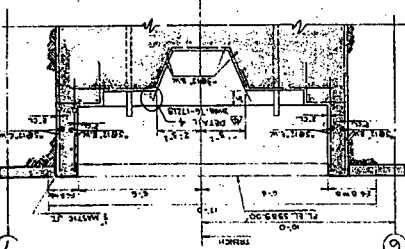
SECTION B-B
SCALE 1/4" = 1'-0"



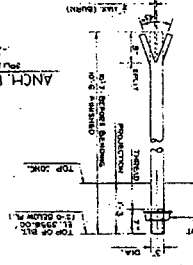
SECTION A-A
SCALE 1/4" = 1'-0"



SECTION C-C
SCALE 1/4" = 1'-0"



ANCHOR BOLT AB-2
SCALE 1/4" = 1'-0"



ANCHOR BOLT SCHEDULE

NO.	DESCRIPTION	QUANTITY	UNIT
1	ANCHOR BOLT AB-1	1	EA
2	ANCHOR BOLT AB-2	1	EA
3	ANCHOR BOLT AB-3	1	EA
4	ANCHOR BOLT AB-4	1	EA
5	ANCHOR BOLT AB-5	1	EA
6	ANCHOR BOLT AB-6	1	EA
7	ANCHOR BOLT AB-7	1	EA
8	ANCHOR BOLT AB-8	1	EA
9	ANCHOR BOLT AB-9	1	EA
10	ANCHOR BOLT AB-10	1	EA

NO.	DESCRIPTION	QUANTITY	UNIT
1	CONCRETE	1	CU YD
2	REINFORCEMENT	1	LB
3	ANCHOR BOLT	1	EA
4	WASHER	1	EA
5	NUT	1	EA
6	ANCHOR BOLT	1	EA
7	WASHER	1	EA
8	NUT	1	EA
9	ANCHOR BOLT	1	EA
10	WASHER	1	EA
11	NUT	1	EA
12	ANCHOR BOLT	1	EA
13	WASHER	1	EA
14	NUT	1	EA
15	ANCHOR BOLT	1	EA
16	WASHER	1	EA
17	NUT	1	EA
18	ANCHOR BOLT	1	EA
19	WASHER	1	EA
20	NUT	1	EA

AS BUILT

FOR REFERENCE DRAWING, SEE DRAWING 76-17217.

SCALE 1/4" = 1'-0"

SCALE 1/4" = 1'-0"

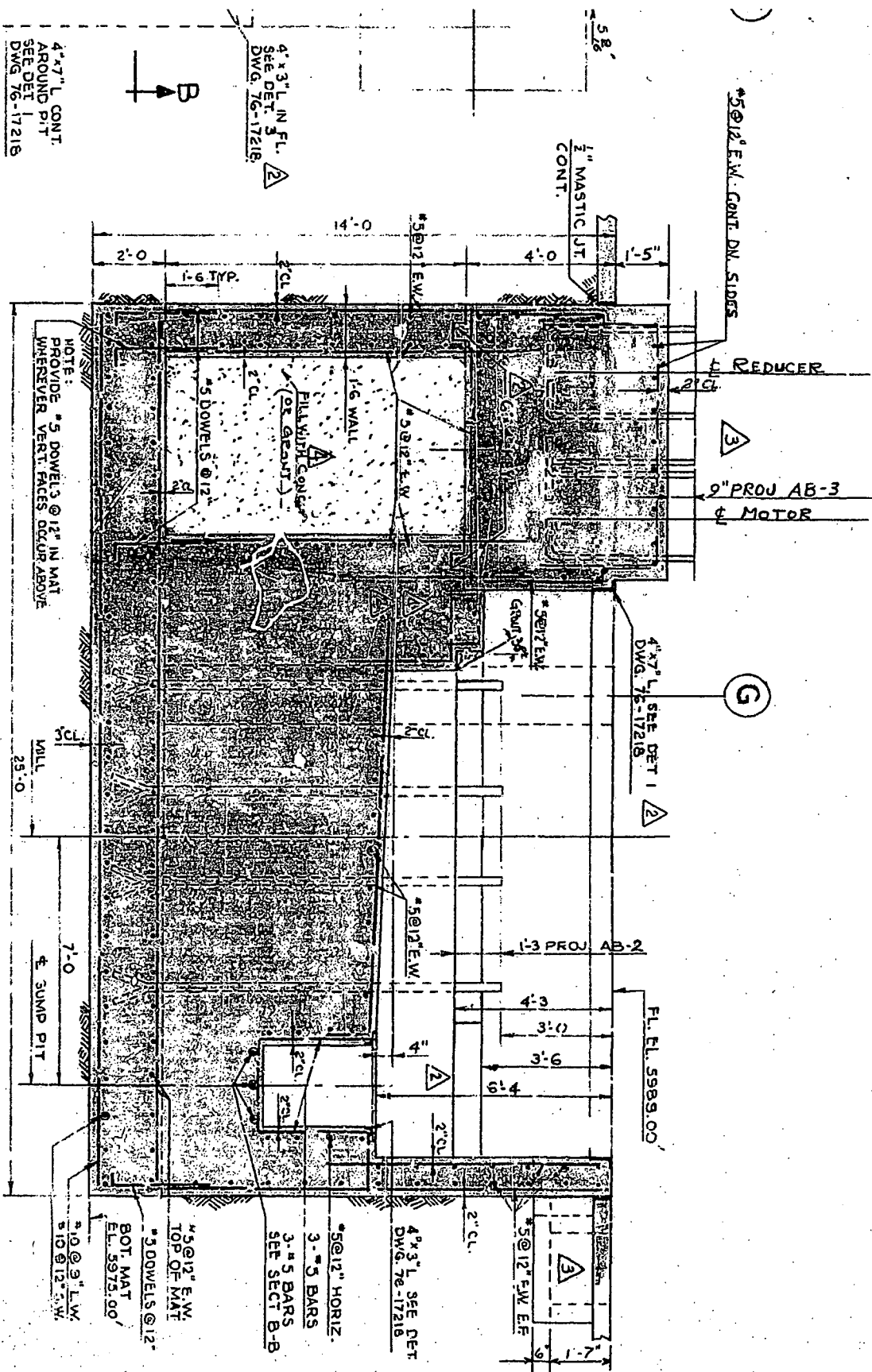
SCALE 1/4" = 1'-0"

SCALE 1/4" = 1'-0"

SCALE 1/4" = 1'-0"

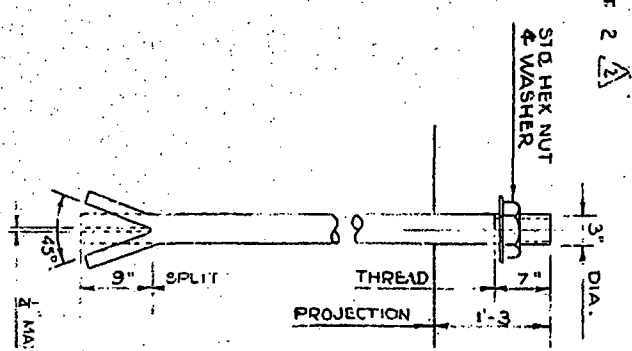
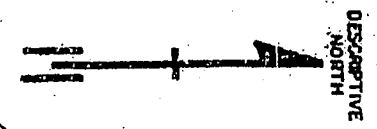
SCALE 1/4" = 1'-0"

SCALE 1/4" = 1'-0"



SECTION A-A

SCALE 3/8" = 1'-0"



SECTION A-A

SCALE $\frac{3}{8}'' = 1'-0''$

4.000
45°
1/2"

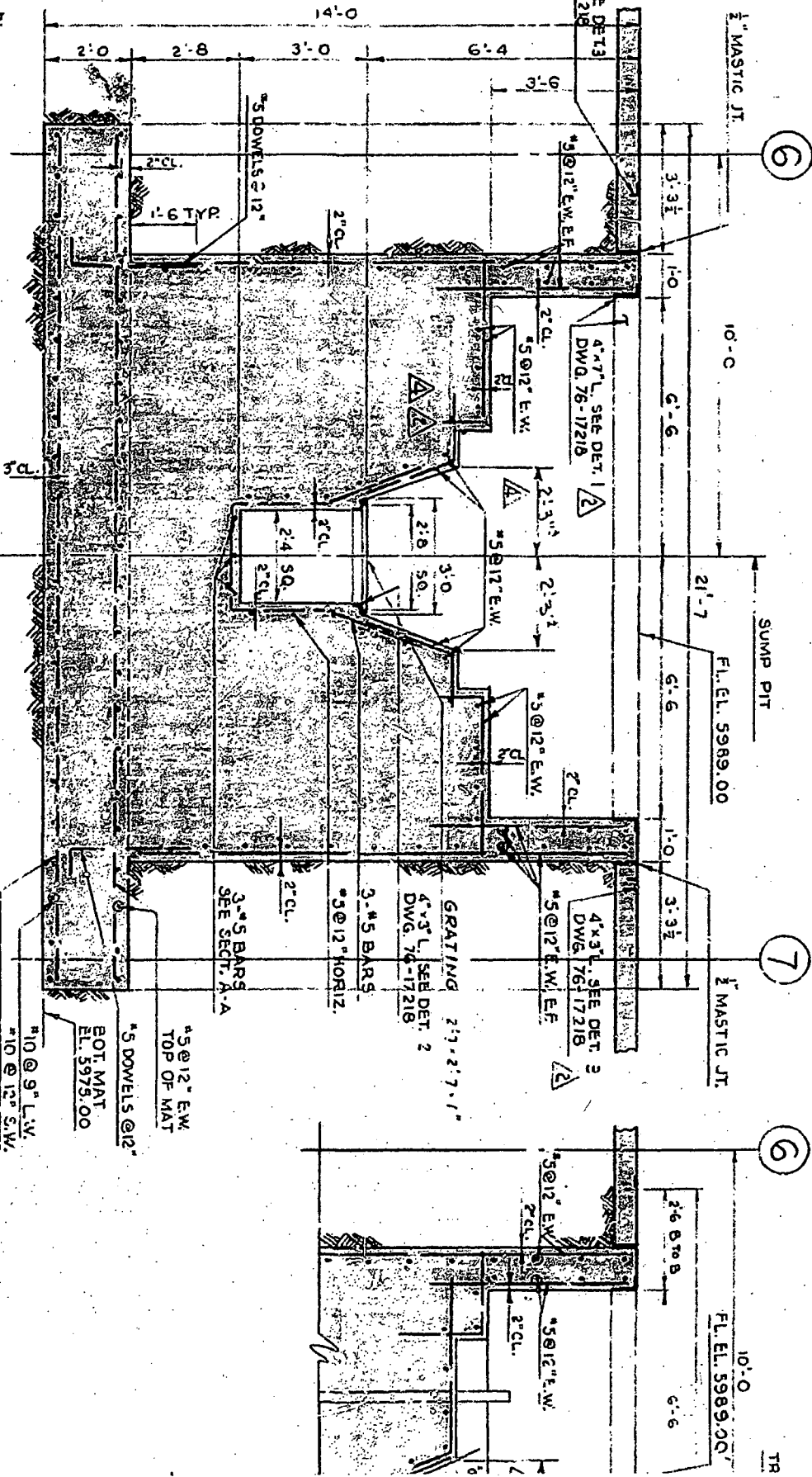
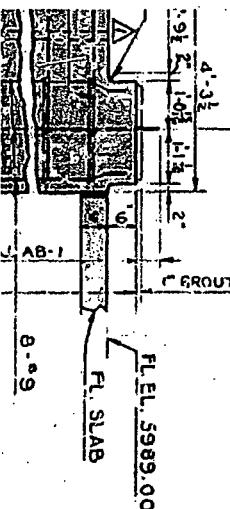
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D

MAT

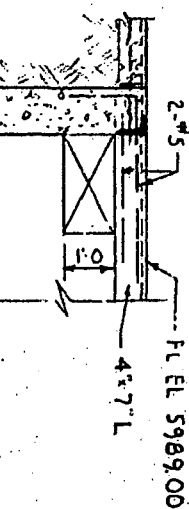
4 COL.

DOWEL ARGT.



SECTION B-B

SCALE $\frac{3}{8}'' = 1'-0''$



FOR R

Sodium Iodide Instrument Information

Survey Area:	V	Survey Unit:	776045	Survey Date(s):	01/24/05
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Instrument Specifications

Instrument #	1	2
Meter Model:	Ludlum 2350-1	Ludlum 2350-1
Meter Serial #:	201199	
Detector Model:	Ludlum 44-17	Bicron G-5
Detector #:	199764	
Detector Size (cm ²):	17.8	125
Calibration Due Date:	6/9/05	
Count Time (min)	0.5	5
Contact Efficiency	9.20%	

Ratio Used

Pu to Am - 241	8.1
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Comments

In cases where the critical level is greater than the calculated dpm/100cm², the critical level will be used for statistical analysis.

Count Times for backgrounds and samples are equal.

Only readings from inside edge were used. Soils and surrounding floors are not representative.

Attenuation Factors: Based on observation of Walls and Ceilings. Epoxy on Floor determined by chip sampling.

Background (Gross)

Instrument #	1	2
Gamma (Ceilings)	N/A	N/A
Gamma (Floors)	152	N/A
Gamma (Walls)	N/A	N/A

Background (cpm)

Instrument #	1	2
Gamma (Ceilings)	N/A	N/A
Gamma (Floors)	304	N/A
Gamma (Walls)	N/A	N/A

Efficiencies (cpm/dpm)

Instrument #	1	2
Thin/No Paint	0.091	0.000
Epoxy	0.074	0.000
Other	0.060	0.000

Coatings

	Thickness (Inches)
Thin/No Paint	0.015
Epoxy	0.250
Other	0.5

Total Activity Estimates Using Sodium Iodide Instruments

Survey Area:	V	Survey Unit:	776045	Survey Date(s):	01/24/05
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Sample Location #	RCT ID #	Instrument #	Gross Counts	Critical Level (dpm/100cm2)	Total Alpha (dpm/100cm2)
1	1	1	111	28,741	28,741
2	1	1	12617	28,741	12,490,703
3	1	1	1653	28,741	1,504,095
4	1	1	158	28,741	28,741
5	1	1	2054	28,741	1,905,922
6	1	1	5,428	28,741	5,286,879

	(dpm/100cm2)
Max	12,490,703
Min	28,741
Average	3,540,847

Final Survey Report For Survey Unit 776046

Initial Scope

This report is prepared to summarize characterization data for survey unit 776046. Survey Unit 776046 consists of the hydroform press pit located beneath Room 127 between column lines 12-13 and G-H. The estimated inventory for this survey unit will not be included in the building inventory when modeling for potential offsite releases.

Historical Review

The hydroform press pit is located beneath the floor of Room 127.

In 2003 six 3" core bores were performed to the maximum depth of the hydroform press pit, 9'-11". The holes were drilled in an engineered pattern to demonstrate that the hydroform press is not present. The core holes revealed solid concrete with rebar in the first 2'-6". An additional 3" core location E16 was drilled at the original location of two pencil tanks mounted at an angle along the wall. No metal was encountered. There is no indication of any equipment encapsulated in the concrete in this pit.

Methods and Techniques

Surfaces were evaluated for potential contamination along cracks that once formed the tops of walls of survey unit 776046. Sodium iodide (NaI) detectors attached to single channel analyzers windowed for the 59 keV gamma-ray(²⁴¹Am) were used to detect contamination along the exposed edge of the pit after the floor of room 127 was removed. Readings from these edges as well as data from the basement in room 127 will be used to represent the walls of the back filled area. Direct alpha measurements were obtained from pieces of metal and concrete that were retrieved by core bores. These readings will be used to represent the contamination levels on the floor of the back-filled area.

Results

The survey involved using measurements at over 16 locations that are considered to be representative of the survey unit. RCT's covering the core sampling collected some of the data and the remainder was collected along the exposed edges in the floor of survey unit 776011. Most of the exposed edge was broken off leaving only the "clean" concrete that was used to backfill the pit. For this reason data from the room 127 basement, survey unit 776010, will be used as well. The pit was adjacent to the basement and had the same potential for being contaminated by the 1969 fire as the basement.

Final Survey Report For Survey Unit 776046

Accessible Areas

Floors

Survey unit 776046 does not have any accessible floors. Contamination estimates for the floors are discussed in the inaccessible area section.

Walls

Survey unit 776046 does not have accessible walls. Contamination estimates for the walls are discussed in the inaccessible area section.

Ceilings

Survey unit 776046 does not have a ceiling. All contamination found on the same level as the slab was accounted for as part of the floor in survey unit 776012.

Inaccessible Areas

Floors

Surveys performed while core sampling the floor showed the highest level encountered was 5,000 dpm/100cm². This reading was on a piece of concrete. It is possible that the contamination was embedded in the concrete and most of the alpha contamination was shielded from the probe. Because there is only one sample point with detectable alpha activity, it will be assumed that the floor of the pit has similar contamination levels as the floor of survey unit 776010, the basement of room 127.

From the final survey report for 776010, the contamination levels on the floor are assumed to be 92,391 dpm/100cm² (4.16 $\mu\text{Ci}/\text{m}^2$).

The area of the floor is determined from Map SK-T0110315 to be 19.6 m²

Surface	Total Surface Area (square meters)	Contamination Levels ($\mu\text{Ci}/\text{m}^2$)	Total Activity μCi
Floors	19.6	4.16	81.5

Walls

The walls of this survey unit are solid concrete. None of the walls are structural. None of the walls can be removed without removing the B776 slab first. A sodium iodide survey was performed along the exposed edge of the pit that remains after the floor of room 127 was removed. Most of the edge was found to be damaged and only the locations with the highest contamination readings are believed to be representative of the

Final Survey Report For Survey Unit 776046

walls of this survey unit. The average contamination level from these readings is consistent with levels found on the walls of survey unit 776010 prior to decontamination. The average contamination level along the top edge is 638,234 dpm/100cm². Assuming it decreases to the levels of the floor with depth, the average contamination level for the walls is 360,313 dpm/100cm² (16.23 $\mu\text{Ci}/\text{m}^2$)

From the " Building 777/776 Buried Equipment White Paper Set 84 ", the maximum depth of the pit is determined to be 10 feet. The plan view of the pit, map SK-T0110315, indicates there are 69 linear feet of walls. The total area of walls is 690 ft² (64 m²).

Surface	Total Surface Area (square meters)	Contamination Levels ($\mu\text{Ci}/\text{m}^2$)	Total Activity μCi
Walls	64.1	16.23	1040.3

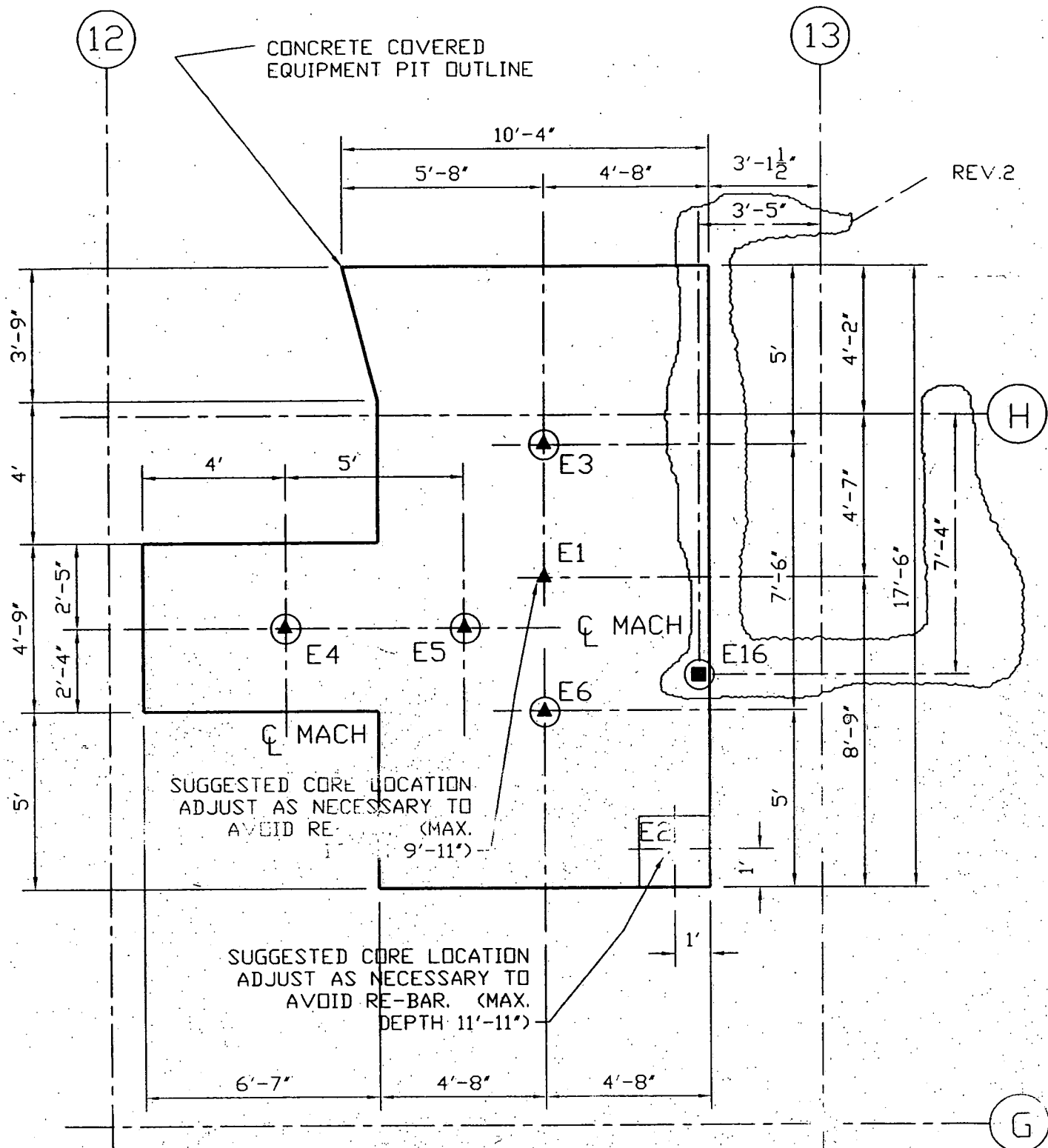
Inventory for Survey Unit 776046

The inventory below is summed from the above tables in this report. A formal PDS survey is not possible in this survey unit because it is filled with concrete and is located below the slab of the building.

Final Results

	Final Results
776046 Inaccessible Area Source Term (μCi)	1121.8
776046 Accessible Area Source Term (μCi)	N/A
776046 Total Source Term (μCi)	1121.8
Survey Unit Wall, Ceiling, and Floor Area (m ²)	83.7
(ASCV _w) ($\mu\text{Ci}/\text{m}^2$)	13.4
(ASCV _w) (dpm/100cm ²)	297,469

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PLAN E
SCALE: 1/4"=1'-0"

REV.2

- ADDITIONAL CORE LOCATION (MAX. DEPTH 6'-0")
- ▲ ADDITIONAL CORE LOCATIONS (MAX. DEPTH 9'-5")

Hydroform Press
Core Bore Pattern
Appendix (5) Page 3

PLAN VIEW FOR BURIED
EQUIPMENT LOCATION E
12-06-02 REV.2
L.TILLEY
SK-T0110315-06

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FOR CONT. OF PLAN
SEE DWG. 76-17222
FOR STAIR DET
SEE DWG. 76-17214

HIGH PT. OF FL.
EL. 5979.08

FOR COR. REINF.
SEE DET. "10"

IGAS JT. AROUND BAS
OF WALL, SEE DETS "

FL. EL. 5'

FOR WALL, SLAB
& COR. STI. SEE
DET. "9" & DET. "10"

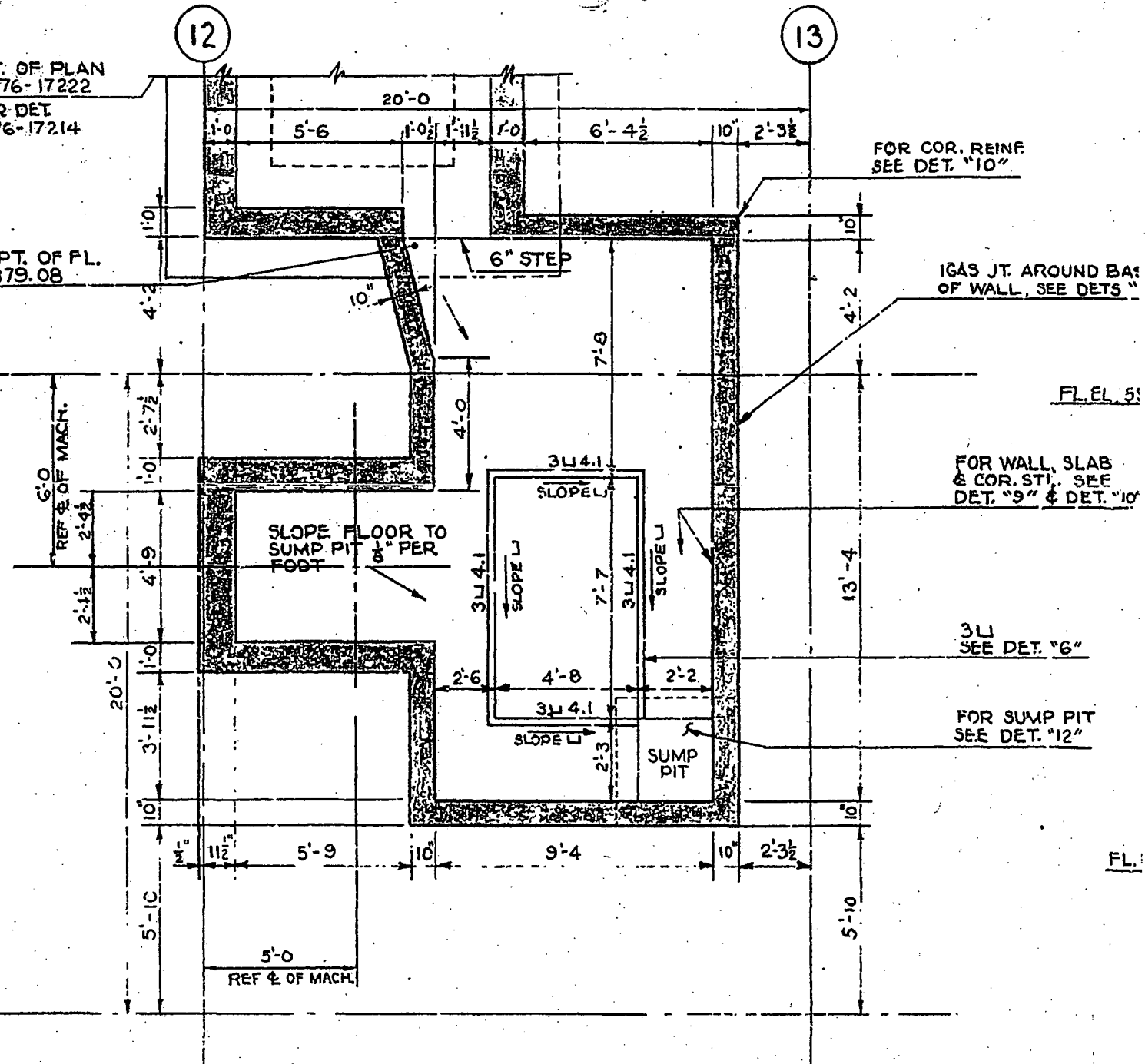
3L
SEE DET. "6"

FOR SUMP PIT
SEE DET. "12"

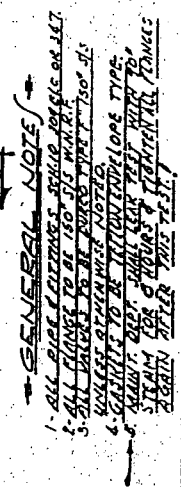
FL.

FOUNDATION PLAN

76-17201
SCALE 1/4" = 1'-0"



Appendix (5) Page 12



WORK AND DRAWINGS MUST AGREE
IF CHANGES ARE DESIRED CO-OPERATE
WITH ENG. DEPT. AND HAVE SAME O.K'D.

REVISIONS		DATE	BY	NO.	NAME	THE BOW CHEMICAL COMPANY	NO.
1		11-16-72				11-16-72	1
2						11-16-72	2
3						11-16-72	3
4						11-16-72	4
5						11-16-72	5
6						11-16-72	6
7						11-16-72	7
8						11-16-72	8
9						11-16-72	9
10						11-16-72	10
11						11-16-72	11
12						11-16-72	12
13						11-16-72	13
14						11-16-72	14
15						11-16-72	15
16						11-16-72	16
17						11-16-72	17
18						11-16-72	18
19						11-16-72	19
20						11-16-72	20
21						11-16-72	21
22						11-16-72	22
23						11-16-72	23
24						11-16-72	24
25						11-16-72	25
26						11-16-72	26
27						11-16-72	27
28						11-16-72	28
29						11-16-72	29
30						11-16-72	30
31						11-16-72	31
32						11-16-72	32
33						11-16-72	33
34						11-16-72	34
35						11-16-72	35
36						11-16-72	36
37						11-16-72	37
38						11-16-72	38
39						11-16-72	39
40						11-16-72	40
41						11-16-72	41
42						11-16-72	42
43						11-16-72	43
44						11-16-72	44
45						11-16-72	45
46						11-16-72	46
47						11-16-72	47
48						11-16-72	48
49						11-16-72	49
50						11-16-72	50
51						11-16-72	51
52						11-16-72	52
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67						11-16-72	67
68						11-16-72	68
69						11-16-72	69
70						11-16-72	70
71						11-16-72	71
72						11-16-72	72
73						11-16-72	73
74						11-16-72	74
75						11-16-72	75
76						11-16-72	76
77						11-16-72	77
78						11-16-72	78
79						11-16-72	79
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82						11-16-72	82
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86						11-16-72	86
87						11-16-72	87
88						11-16-72	88
89						11-16-72	89
90						11-16-72	90
91						11-16-72	91
92						11-16-72	92
93						11-16-72	93
94						11-16-72	94
95						11-16-72	95
96						11-16-72	96
97						11-16-72	97
98						11-16-72	98
99						11-16-72	99
100						11-16-72	100

FILED IN 4-508-16
FOR PREC. WELD SPECIES

ELEVATION 'B-B'

EXPOSITION '89

~~GENERAL NOTE~~

TYPICAL P.C. INSTALLATION
12. PRO.D.

diagram of a simple machine

piston

handle

fulcrum

spring

dot

Sodium Iodide Instrument Information

Survey Area:	V	Survey Unit:	776046	Survey Date(s):	01/25/05
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Instrument Specifications

Instrument #	1	2
Meter Model:	Ludlum 2350-1	Ludlum 2350-1
Meter Serial #:	201199	
Detector Model:	Ludlum 44-17	Bicron G-5
Detector #:	199764	
Detector Size (cm ²):	17.8	125
Calibration Due Date:	6/9/05	
Count Time (min)	0.5	5
Contact Efficiency	9.20%	

Ratio Used

Pu to Am - 241	8.1
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Background (Gross)

Instrument #	1	2
Gamma (Ceilings)	N/A	N/A
Gamma (Floors)	152	N/A
Gamma (Walls)	N/A	N/A

Background (cpm)

Instrument #	1	2
Gamma (Ceilings)	N/A	N/A
Gamma (Floors)	304	N/A
Gamma (Walls)	N/A	N/A

Efficiencies (cpm/dpm)

Instrument #	1	2
Thin/No Paint	0.091	0.000
Epoxy	0.074	0.000
Other	0.060	0.000

Comments

In cases where the critical level is greater than the calculated dpm/100cm², the critical level will be used for statistical analysis.

Count Times for backgrounds and samples are equal.

Only highest readings were used.

Attenuation Factors: Based on observation of Walls and Ceilings. Epoxy on Floor determined by chip sampling.

Coatings

	Thickness (Inches)
Thin/No Paint	0.015
Epoxy	0.250
Other	0.5

Total Activity Estimates Using Sodium Iodide Instruments

Survey Area:	V	Survey Unit:	776046	Survey Date(s):	01/25/05
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Sample Location #	RCT ID #	Instrument #	Gross Counts	Critical Level (dpm/100cm2)	Total Alpha (dpm/100cm2)
1	1	1	224	28,741	72,148
2	1	1	2563	28,741	2,415,972
3	1	1	188	28,741	36,074
4	1	1	173	28,741	28,741

	(dpm/100cm2)
Max	2,415,972
Min	28,741
Average	638,234